

**METHOD OF PERFORMING A SIMON'S OR A SHOR'S QUANTUM  
ALGORITHM AND RELATIVE QUANTUM GATE**

**Abstract of the Disclosure**

A method for performing a Simon's or Shor's quantum algorithm over a function encoded with  $n$  qubits is provided. The method includes performing a superposition operation over a set of input vectors for generating a superposition vector, performing an entanglement operation for generating a corresponding entanglement vector, and performing an interference operation for generating a corresponding output vector. The superposition operation is carried out in a comparably fast manner by generating the superposition vector by identifying the non-null components thereof and by calculating, as a function of the  $n$  qubits, the value  $1/2^{n/2}$  of all the non-null components of the superposition vector, and by calculating indices of these components according to an arithmetic succession. The seed of this calculation is 1 and the common difference is  $2^n$ . The method may be implemented in a quantum gate.